

What is claimed is:

1 1. An apparatus for depositing a magnetic film, comprising:
 2 a sputtering chamber containing a target, a substrate having a surface that is separated
 3 from the target, and a grounded collimator positioned between the target and the substrate;
 4 and
 5 a magnet array disposed within the chamber to form a substantially parallel magnetic
 6 field at the surface of the substrate.

1 2. The apparatus of claim 2, wherein the target comprises a material that retains magnetic
 2 properties when deposited on the surface of the substrate.

1 3. The apparatus of claim 3, wherein the target is separated from the substrate by a long
 2 throw distance of at least 50 mm.

1 4. The apparatus of claim 4, wherein the magnet array is a circular ring.

1 5. The apparatus of claim 5, wherein the target comprises a nickel/iron alloy. *submitted*

1 6. An apparatus for depositing a magnetic film, comprising:
 2 a sputtering chamber containing a target and a substrate separated by a long throw
 3 distance of at least 50 mm; and
 4 a magnet array disposed within the chamber to form a parallel magnetic field at a
 5 surface of the substrate.

1 7. The apparatus of claim 6, further comprising a grounded collimator disposed within
 2 the sputtering chamber between the target and the substrate.

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1 8. The apparatus of claim 7, wherein the magnet array is a circular ring.

1 9. A method for depositing a magnetic film within a sputtering chamber containing a
2 target and a substrate, comprising:

3 sputtering the target at a chamber pressure less than 15 mTorr; and

4 maintaining a surface of the substrate at a long throw distance of at least 50 mm from
5 the target and within a magnetic field during sputtering of the target, the magnetic field being
6 substantially parallel at the surface of the substrate.

1 10. The method of claim 9, further comprising collimating sputtering of the target with a
2 grounded collimator disposed between the target and the substrate.

1 11. The method of claim 10, wherein the target comprises a Ni/Fe alloy.

1 12. The method of claim 11, wherein the target is sputtered by a plasma generated in a
2 magnetic field maintained adjacent the target by a magnetron disposed outside the sputtering
3 chamber.

1 13. The method of claim 12, wherein the parallel magnetic field is generated by a circular
2 magnet array disposed within the sputtering chamber.

1 14. The method of claim 13, wherein the chamber pressure is less than 5 mTorr.

1 15. A method for depositing a magnetic film within a sputtering chamber containing a
2 target and a substrate, comprising:

3 sputtering the target onto a surface of the substrate at a pressure less than 15 mTorr;

4 collimating sputtering of the target with a grounded collimator disposed between the
5 target and the substrate; and

1 16. The method of claim 15, wherein the sputtering occurs at a chamber pressure less than
2 15 mTorr.

17. The method of claim 16, further the parallel magnetic field is provided by a circular ring of magnets disposed within the chamber.

18. The method of claim 17, wherein the target and the surface of substrate are maintained at a long throw distance of at least 50 mm during sputtering.

1 19. The method of claim 18, wherein the target comprises a Ni/Fe alloy.

1 20. The method of claim 19, wherein the grounded collimator removes charges from
2 target particles and reduces interference with the parallel magnetic field.

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